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INDICATIONS AND CONTRA-INDICATIONS
FOR ALTITUDE IN THE TREATMENT
OF PULMONARY TUBERCULOSIS.

BY ✓

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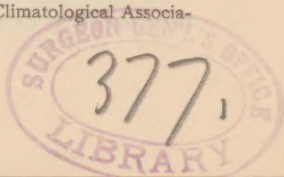
**INDICATIONS AND CONTRA-INDICATIONS FOR
ALTITUDE IN THE TREATMENT OF
PULMONARY TUBERCULOSIS.¹**

BY FREDERICK I. KNIGHT, M.D.,
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It is generally admitted at the present day that the study of the climatic relations of pulmonary tuberculosis is an exceedingly complicated one, not only with reference to the origin of the disease, but also with reference to its progress and termination. It is also now generally admitted that an outdoor life in the purest attainable air is one of the most desirable conditions to secure for those patients affected with the disease, in whom its arrest is hoped for.

The purest, most nearly aseptic air is found on the ocean and at high elevations; but as, in order to be of lasting benefit, stay in the new conditions should be considerably prolonged, ocean air is out of the question for most patients, and one looks to the mountains for a place of prolonged residence. Here

¹ Read at the meeting of the American Climatological Association, Washington, September, 1888.



we have also, in the beginning at least, an increased respiratory activity, which acts beneficially on the nutrition of the pulmonary parenchyma.

It is, however, well known that high altitude disagrees with and is thoroughly unsuited to some tubercular patients, and it is for the purpose of guarding a part, at least, of these patients against an experiment in climate, the result of which might be an irremediable injury, that I ask for a discussion upon a few propositions laid down in a rather tentative way.

In considering the question of high altitude in this paper, I will restrict the application of this term to such elevations as will usually allow of prolonged residence without danger of anoxyhæmia (4000 to 6500 feet above the sea-level).

The contra-indication to altitude in the treatment of patients with pulmonary tuberculosis may be found to pertain to some general factor, such as the age or temperament of the patient, to the type or stage of the disease itself, or to some complication of other disease.

Is there any limit of age which would forbid or render less promising the residence of a tuberculous patient in high altitudes?

I am inclined at present to put such a limit at about fifty years. After that period the chest-walls are less elastic, the patient is more susceptible to cold and sudden changes of temperature, and at the same time less inclined to take active exercise.

Is there any temperament which should be prohibited a trial of the high altitude treatment?

It may be said that the energetic stimulation of the mountain air is suited rather to the phlegmatic than the nervous temperament, and that individuals of the latter type sometimes do very badly in it. These patients usually have an irritable heart, frequent pulse, and inability to resist cold. We must be sure, however, before denying a patient the benefit of this treatment on account of temperament, that we classify him properly, for there are patients, weak and irritable from disease, who at first might strike us as of a neurotic nature, but who are not constitutionally so, and who will improve quickly under mountain stimulation.

What is there in the nature or condition of the disease itself which may contra-indicate residence in a high altitude?

For the sake of convenience, I will make use of the types of the disease employed by me in a previous paper.¹

1. Patients presenting the earliest physical signs of tuberculosis of the apex, who have as yet shown little, if any, general disturbance from the disease, and who complain only of morning cough and expectoration.

These are the patients who are known to recover under a great variety of conditions, both climatic and social; but it seems to me, after considerable experience, that a larger proportion have recovered under the high altitude conditions than under any other. With a few exceptions, such as for general

¹ On the selection of a climate for patients with pulmonary tuberculosis. Boston Medical and Surgical Journal, April 5, 1888.

reasons previously mentioned, I should recommend high altitudes for these cases.

2. Patients with more advanced disease, showing some consolidation, but no excavation, nor any serious constitutional disturbance.

High altitude is suited to many of these cases also ; but if a considerable area of one lung, or the apices of both are consolidated, if the pulse and temperature are both always above 100, it may be well to try some low altitude first. When quiescence in the morbid processes is established, a change to higher altitude can be made.

3. Hemorrhagic cases. Patients in whom pulmonary hemorrhage has been, perhaps, the earliest, and a frequently recurring symptom, but in whom there is, as yet, no marked febrile reaction, nor much physical evidence of disease.

In my experience this class has done particularly well in high altitudes. The tendency to hemoptysis seems to be diminished rather than increased. This seems to me to be explicable more through improvement in nutrition of the lung parenchyma than by change in the atmospheric pressure, for the lung cannot be considered an internal organ, as far as atmospheric pressure is concerned, but must be considered as subject to the same pressure as the skin, and, therefore, in high altitude more liable to superficial congestion and hemorrhage. Theoretically, therefore, there was good reason for the old custom of avoiding the sending of such patients to the mountains, but practically I have never experienced ill results from so doing.

4. Patients with advanced disease; those with cavities, or severe hectic symptoms.

Patients with advanced disease, or, better stated, with great area of lungs involved, should not be sent to high altitudes. The demand for increased respiratory activity, which cannot be answered, is apt to be quickly followed by fatal result. The existence of a small cavity, in a case in which the disease had become quiescent, would not contraindicate high altitude. Hectic symptoms would do so.

5. Patients in an acute condition.

None of these should be sent into high altitudes.

6. Cases of so-called fibroid phthisis or interstitial pneumonia.

If the patient is over fifty years of age, if his heart is dilated, or if there is great bronchial irritability, producing harrassing cough, he should not be sent into high altitude.

7. Patients convalescent from acute pleurisy or pneumonia, in whom the eruption of tubercle is dreaded.

Unless otherwise contra-indicated, elevation is particularly suited to this class of cases.

8. Patients in whom the tubercular process has seriously invaded the larynx.

It is generally recommended by those familiar with them, that these patients be not sent to high altitudes. In view of modern methods of local treatment, they certainly should not be sent there to the deprivation of this; but should they be sent to high altitudes if they can also have the benefit of

good local treatment? With others I have been prejudiced against sending these patients to the mountains, but it may be that this prejudice is groundless for high altitudes which are free from dust, and that they do no worse here than anywhere, the disease when it has once seriously attacked the larynx usually pursuing an unfavorable course. I know that some of the resident physicians of high altitudes do not share this prejudice.

9. Those with complications of other diseases.

Much care should be exercised in regard to cases of this class.

One of the first in importance to suggest itself will be cardiac disease. Cardiac dilatation should preclude the consideration of altitude; and it would be safer to say the same in regard to most cases of hypertrophy, though if this be moderate and of slow development, the patient might be allowed some elevation. There are many patients, however, who are unwarrantably denied the benefit of high altitude on the ground of heart disease, *e. g.*, patients with a cardiac murmur the result of endocarditis quite long ago, in whom there is no evidence of deranged circulation, and no sign of cardiac enlargement. Of course, the mere existence of a murmur is no evidence of cardiac condition liable to be unfavorably affected by rarefied air. On the other hand, there are some patients with nervous derangement of the heart who had better be advised against high altitudes. These, however, would usually be of the general neurotic type before spoken of.

Disease of the large bloodvessels is an evident contra-indication.

Patients with bronchial dilatation or pulmonary emphysema are not usually recommended to high altitudes, presumably on account of diminished respiratory area. I have not had much personal experience with such patients in high altitudes, but would like to hear from those who have had. There are some with excessive bronchial irritability who certainly do better in lower regions.

In regard to renal disease, while it is admitted by resident physicians that acute nephritis, like acute pneumonia, is severe in high altitudes, they claim that chronic nephritis is often benefited.

Intestinal ulceration would not contra-indicate a high altitude, but no great good could be expected from the change.

In cases of epilepsy, diseases of the brain and spinal cord, which are said by some to contra-indicate altitude, I have had no experience.

It looks to me as if the claim that heredity is a contra-indication of altitude must have originated in the mind of one who was afraid lest his percentage of cures should be lowered by bad cases, for, while admitting that patients with hereditary tendency to tuberculosis are on that account less favorable for any treatment, when taken in hand early they are especially benefited by mountair-air life.

Diabetes would seem properly to contra-indicate high altitude treatment, as its subjects are very liable to succumb to attacks of any acute disease, and

these would be more liable to occur in a variable than in an equable climate.

Upon what grounds syphilis is put down by some as a contra-indication I know not.

The combination of tuberculosis and syphilis is a very unfavorable one, and liable to result badly in any climate.

